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A SHORT BOTANICAL HISTORY OF KING GEORGE'S SOUND

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I feel myself to have been particularly fortunate, during my short stay in Western Australia, to have been able to visit King George's Sound, for this is one of the classical localities in Australian botany. So many and rich are its associations with the history of that science, that the visitor can hardly escape the feeling of undertaking a scientific pilgrimage, and may be moved to search out and bring together some of the scattered accounts of botanical exploration here, a complete history of which has yet to be written.

Our story began on September 28, 1791, when Captain George Vancouver, on H.M.S. *Discovery,* preceded by H.M.S. *Chatham,* sailed into a sheltered inlet on the south-west coast and anchored there. Vancouver, who had sailed with Captain Cook on the latter's second and third voyages of discovery, was commissioned to continue the exploration of the north Pacific Ocean, and was now proceeding there by way of the Cape of Good Hope and Australia. Archibald Menzies was surgeon and botanist to this expedition. On September 29, a party landed and took possession at Possession Point, the name King George the Third's Sound (now usually shortened) was given to the inlet, and the sheltered western basin was called Princess Royal Harbour in honour of Princess Charlotte whose birthday it was. The ships remained until October 11, and during this stay the coast was charted and the chief physical features were named, while according to Vancouver, "the vegetation afforded to Mr. Menzies much entertainment and employment". Both the spelling and the nomenclature of Menzies' *Journal* are somewhat obsolete, mention being made of *Apium antiscorbuticum,* (doubtless *A. prostratum* Labill.), *Banksia, Myrtus** (perhaps *Agonis), Mimosa (Acacia pulchella* and perhaps other species), *Eucalyptus obliqua* (presumably *E. calophylla,* wrongly identified with *E. obliqua* L'Her. which is not found here), *"Meloluca"* and *"Calcolaria"**. Vancouver, in his own *Journal,* speaks of the "Gum plant" *(Xanthorrhoea Preissii),* the "gum tree" *(Eucalyptus calophylla)* and a holly-like plant *(Dryandra floribunda).* On Green Island, in Oyster Harbour, Vancouver planted "vines and water-

*It is doubtful what plants are intended here, neither *Myrtus* nor *Calceolaria* being recorded in W.A.

cresses" and "an assortment of garden seeds, with some almonds, orange, lemon and pumpkin seeds were sown", with the idea of benefitting subsequent visitors to the country, but Flinders in 1801 could find no trace of them. There is a local belief that Vancouver watered his ships at the eastern side of the entrance to Oyster Harbour where "Captain Vancouver's Well" is marked by a tablet. It is now recognised that an error has occurred. From the *Journal* and the charts it appears that wood and water were obtained on the south side of the Sound near what is now Frenchman's Bay.

In December 1792, the French ships *La Recherche* and *L'Esperance* under the command of Admiral Bruny d'Entrecasteaux (Citoyen Dentrecasteaux of Rossel's narrative) en route from Timor to Van Dieman's Land in search of the lost expedition of La Perouse, sighted the coast near Cape Leeuwin and followed it south and east. On December 6, towards evening, they saw a large bay at the entrance to which were two islands (the smaller Seal Island being easily overlooked.) It was not until the bay was passed that they were able to see it would have been a good anchorage, and though d'Entrecasteaux would have liked to have visited it, for his water was running low, the wind was bearing him eastward so strongly that he continued on his course. The botanist of this expedition was Jacques Julien de Labillardiere, commemorated in the Australian genus *Billardiera* (Pittosporaceae) and though he was thus denied an opportunity of landing at King George's Sound he did so soon after at Esperance Bay where, among other plants common to the two regions, he met and later described *Anigozanthus rufa* and *Chorizema ilicifolium**.

When Captain Mathew Flinders arrived from England in December, 1801, on H.M.S. *Investigator* to survey the southern coasts of Australia, he chose King George's Sound as a suitable place to prepare his ship for the task. The botanist to this expedition was the illustrious Robert Brown, to whom it was due, wrote Sir Joseph Hooker, "that this voyage proved, as far as botany is concerned, the most important in its results ever undertaken, and marks an epoch in the history of that science". Brown had two assistants, Ferdinand Bauer, botanical draughtsman and Peter Good, previously a foreman gardener at Kew, who during this voyage contracted a fever and died at Sydney in 1803. Both these assistants are remembered in the names of Australian genera. Although the stay at King George's Sound was not made at the best or most comfortable time of year for collecting, about 500 species were obtained during the four weeks spent there.

Another French expedition, in the vessels *Geographe* and *Naturaliste* under the command of Capt. N. Baudin, was visiting our shores at the same time. At Sydney an additional craft was obtained, a small schooner intended for the exploration of shallow

*A pleasing story sometimes told about the etymology of "Chorizema" receives no confirmation from either of Labillardiere's works consulted. His party had been short of water, but it is not recorded either that the plant grew by water, or that the party danced for joy on finding it. On the other hand, no alternative derivation is suggested.

coastal water, and this was renamed *La Casuarina,* being built of the timber of a tree of that genus. During a survey of the coast of what is now South Australia, the schooner, commanded by Capt. Louis Freycinet, lost contact with the *Geographe* (the *Naturaliste* had previously been sent back to France) and headed for King George's Sound. Only through the fortunate circumstance of a favourable wind which blew for six days were they able to reach this port, in February 1803, after suffering great hardship through lack of water, and they were joined here a few days later by the *Geographe.* This expedition carried a large scientific complement including the zoologist Francois Peron and the botanist Leschenault de la Tour, who a few months later was left at Timor, a sick man. This may have some bearing on the obscurity which surrounds his activity at the Sound. On the outward passage, however, he had collected on the west coast further north, and is remembered in a beautiful and predominantly western genus of the Goodeniaceae.

It had been intended that Flinders should complete the survey of the Australian coast, but when returning to England after his voyage of 1801-03, he was detained by the Governor of Mauritius for more than six years during hostilities with France, and lived only long enough after his release to complete the account of his voyage and charts, dying shortly before they were published. The northern and north-western coasts therefore remained very imperfectly known, so in December 1817, the Australian navigator Captain Phillip Parker King was sent from Sydney in the cutter *Mermaid* of only 84 tons, to chart these coasts. King himself had a great interest in natural history as is shown by his drawings of plants, shells, fishes, insects and scenery, some of which are preserved in the Public Library at Perth. He had as companions John Septimus Roe, marine surveyor, and Allan Cunningham, H.M. Botanist in Australia and later for a time Colonial Botanist of New South Wales. With Cunningham a new phase in Australian botany was ushered in. Before his time it had been chiefly the pursuit of visitors from abroad who made their collections and then returned to their own countries to study them, but from now on it became more and more the province of botanists resident in Australia. His own very extensive travels included New Zealand, and their arduous nature no doubt attributed to his death at Sydney at the age of 48. The *Mermaid* anchored near the supposed "Captain Vancouver's Well" where wood and water were obtained, and here Cunningham with much labour tried to establish a garden as Vancouver had done on the nearby island. He also "made a large collection of seeds and dried specimens from the vast variety of beautiful plants with which nature has so lavishly clothed the hills and plains of this interesting country". King and Cunningham were here again in 1821, and the versatile mariner has left us a water-colour of his ship at anchor at this point. Cunningham's garden had quite disappeared, a reminder of the unfavourable terms on which introduced plants compete with an indigenous flora so well adapted to its rather difficult environment.

About 1823-25, William Baxter collected at the Sound for a

private employer in England, and in 1829 he was here again, this time in the joint employ of private interests and the Colonial Office, part of his collection going to Sydney. He is remembered by the monotypic genus *Baxteria,* akin to *Xanthorrhoea,* which is endemic here.

Ranking high among French explorers is Dumont d'Urville whose account of his voyage to the Pacific in the corvette *L'Astrolabe,* with the accompanying scientific reports and illustrations, fills twenty large volumes. On the outward passage he called at King George's Sound on October 7, 1826, remaining until October 25, and making a survey of the coast besides pursuing varied scientific studies for which the expedition was equipped. The two botanists, A. Lesson and A. Richard collected here as did d'Urville himself, obviously a keen naturalist, sparing time amid his many other duties. He showed great enthusiasm for the work, remarking that the plants were as numerous as they were elegant in shape and varied in structure and colour. Although the greater part of the work of the expedition concerned New Zealand and the Pacific Isles, several species of plants from the Sound, eg. *Stackhousia pubescens* and *Eriostemon spicatus,* were subsequently described by Richard.

King George's Sound was now attracting roving whaling and sealing parties of several nationalities, particularly American and French, so it was thought prudent to establish British claims by actual occupation. In December 1826, Major Edmund Lockyer of H.M. 57th Regiment arrived in the *Amity* with a party of 52 persons to establish an outpost of the New South Wales Colony. A site was chosen on the north shore of Princess Royal Harbour, between Mt. Clarence and Mt. Melville, and here on January 21, 1827, the settlement was founded, the name of Frederick Town soon being changed to Albany. The position now appears an admirable one, with deep water anchorage for the largest ships, but the first settlers encountered several serious difficulties resulting from this choice of site, notably a shortage of fresh water and good building timber, and the poverty of the soil which induced them to go farther afield to grow their crops, Green Island being found one of the most productive places.

The establishment of the Swan River Colony which soon followed introduces three other botanical characters into our story. When Captain James Stirling, R.N. was sent in 1827 by Governor Darling of New South Wales to reconnoitre the west coast with a view to settlement, he was accompanied by Charles Fraser whose duty it was to report on the agricultural possibilities of the new country. Fraser, it is believed, was formerly a soldier, but had been appointed Colonial Botanist and was concerned with the establishment of the Sydney Botanic Gardens. On their return from the Swan River to Sydney, Stirling and Fraser visited the settlement at the Sound. As a consequence of their favourable report, an expedition was fitted out in England with Captain Stirling in command, and he sailed with the civil establishment in the transport *Parmelia,* H.M. Sloop *Sulphur* as escort bringing

the military detachment, the ships arriving at the mouth of the Swan River in June, 1829. The surgeon of the *Sulphur* was Alexander Collie who was soon appointed Resident at Albany and explored actively between there and the Swan River. His chief concern was the suitability of the land for settlement, but he collected in the regions he passed through and at least part of his collection was transmitted to England. With the *Parmelia* arrived James Drummond who figures so largely in the botanical exploration of Western Australia. His position in the civil establishment is not very clear, for though he was responsible for horticulture in the new colony, his appointment was "without pay at present". He brought with him a collection of seeds, plants, tubers provided by order of the council of the Horticultural Society (now the Royal Horticultural Society), including fruit trees and bushes, rhubarb, potatoes, dahlias, chrysanthemums and other unspecified esculent and ornamental subjects. The following April he was appointed Government Naturalist. Later he took up farming, and between this and the care of a large family found time to undertake extensive collecting trips in the course of which he visited the Sound.

An early visitor to the Swan River Colony was the Austrian traveller Baron Karl von Hugel who landed at Fremantle in November 1833, and after collecting around the northern colony, sailed for King George's Sound which he reached on January 1, 1834. His excursions in this area took him as far as twelve miles inland along the King and Kalgan Rivers. A list of the plants he collected in Western Australia, with descriptions of the new species, was published in Vienna in 1837.

Although his call was of little consequence to Western Australian botany, it is worth noting that Charles Darwin is numbered among the Sound's distinguished visitors, arriving with the *Beagle* on March 6, 1836, and remaining for eight weeks. The contrast between his remarks of tedium and dullness and the enthusiasm of earlier visitors is very marked. We may at least partly understand it if we remember the time of year, when the vegetation would be far from its best, and that he was undoubtedly feeling the effects of more than four years travelling. The mere physical strain of such a journey must have been considerable, but add to this the ever growing load of collections, notes, and unformed ideas waiting to be worked out, and his impatience to be home will cause no surprise.

An early link with British horticulture was the visit in December 1837, of James Backhouse, of the York Nursery. A respected member of the Society of Friends, he travelled "solely for the purpose of discharging a religious duty", but the narrative of his six years in Australia is full of observations on many subjects and he wrote of the plants freely and with knowledge. The slow growth of the colony is shown by his remarks that then, more than ten years after its foundation, the population was "very small" and that it was a "poor place, consisting of a few scattered cottages". In the course of his walks he was impressed with the variety and gaiety of the plants, and mentions, among other genera,

Banksia, Pimelea, Anigozanthus, Sollya, Haemodorum, Anthocercis and *Kingia,* but the Christmas tree, *Nuytsia floribunda,* which was then flowering, received his greatest admiration. He observed that this plant belonged to the same family as the Mistletoe, but "grew out of the ground", unlike most Loranthaceae and he adds later in his narrative that near Perth the name "cabbage tree" was applied to it. He was also attracted by the Pitcher Plant *Cephalotis follicularis**, and noted the presence of drowned insects in the pitchers "of very singular structure."

Of the collectors of Western Australian plants who came from continental Europe, one of the most active was Dr. Ludwig Preiss who arrived at the Swan River in 1838 and remained in the State until 1842. He had James Drummond as an associate on some of his expeditions which took him inland and along the west and south coasts to the Sound and as far as Cape Riche. His collection of nearly three thousand specimens occupied a number of German workers after his return and was published in Hamburg between 1844 and 1847 in Lehmann's "Plantae Preissianae".

The marine algae of King George's Sound received special attention from Dr. William Henry Harvey, Professor of Botany at Dublin, who will be remembered for his "Phycologia Australica". He arrived on January 7, 1854, and writing on January 29, had already collected 2,500 specimens of algae, though of only about 70 species. He was too late in the season for the majority of wildflowers, but he appears to have done some collecting of phanerogams during his stay. On April 2 he left by cart on the overland journey to the Swan River, returning to the Sound early in August and spending most of that month there, sailing for Melbourne on April 29.

A name always to be remembered in Australian botany is that of Baron Ferdinand von Mueller, who was born of Danish parents at Rostock, Germany, and came to Australia for reasons of health. After about four years in South Australia, he was appointed to the newly created post of Government Botanist of Victoria in 1852. Since the time of Cunningham, no botanical explorer had travelled so extensively in Australia, and though his work lay mainly in Victoria and the eastern part of the continent, he was three times within the boundaries of Western Australia. Only once, though, in 1867, did he visit the Sound, when he was investigating the forest resources of Western Australia, but of the collectors in his employ Augustus Oldfield worked here about 1859 and George Maxwell may be presumed to have used the Sound as a base for his expeditions inland and eastwards from here. These two collectors obtained material which was transmitted to Kew with much of Mueller's own and was used in the compilation of the *Flora Australiensis.*

No attempt can be made to enumerate all those, amateur and professional, from Australia and abroad, who have botanised

*The plant was described by Labillardiere who said it grew in "Leeuwins Land," but Bentham gives Labillardiere's locality as King George's Sound, a place he did not visit. Possibly Bentham used that name in an extended sense for the South-west generally.

round King George's Sound in the last eighty years, still less to do justice to their work, but this account could not be closed without mention of the visit of Dr. Ludwig Diels and Dr. Ernst Pritzel at the beginning of this century. Landing at Fremantle on October 3, 1900, they made excursions north, south and east from there, visiting King George's Sound for the first time in January, 1901, and spending most of the month there. Before their departure at the end of the year, they were at the Sound on six further occasions. The significance of this visit to Western Australia lies not so much in the collections made or in the new species, 235 in number, which were found, as in the pioneer ecological work which was accomplished and which has served as a foundation for all subsequent investigations.

During more than a century which has passed since its establishment, the growth of Albany has been slow. While the Swan River Colony has become the metropolitan area, including the cities of Perth and Fremantle with their suburbs and a population exceeding two hundred thousand, Albany has less than five thousand inhabitants, its value as a port for communication with eastern Australia having been greatly reduced with the opening of the transcontinental railway in 1917. From a national point of view, this tardy development of an excellent natural port is much to be regretted, yet for many it must be felt a fortunate circumstance that within a mile of the town centre native plants still bear their annual wealth of blossom, and that in many places around the shores of the Sound there has been no appreciable change in vegetation or scenery since Vancouver and Menzies landed here.

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BIOCLIMATIC CONTROLS IN WESTERN AUSTRALIA

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(Continued from p. 107)

WATER BALANCE

The rainfall of any particular place does not give an exact idea of the moisture condition of that place, because evapo-transpiration must be taken into account. Two places with the same total annual rainfall may have entirely different moisture conditions because the potential evapo-transpiration of one place is high while that of the other place is low. The balance between rainfall and potential evapo-transpiration gives the moisture condition; there are four possible types of moisture balance.

It may happen that the rainfall equals the potential evapo-transpiration, and in this case there is neither water surplus nor water deficit.

When the rainfall is smaller than the potential evapo-transpiration there is a water deficit, the movement of water in the soil is more frequently upwards than downwards, calcium carbonate and other water-soluble salts tend to accumulate in the soil, and plants and animals must be able to overcome the disabilities associated with these conditions.

When the rainfall is greater than the potential evapo-transpiration, some of the water which is not evaporated from the soil or transpired by plants will seep into the ground and be stored there for a while. Only after the whole storage capacity of the ground is filled, will there be any real surplus of water. This surplus water will run off above and below the ground (Map 17). The soil will not show accumulation of calcium carbonate or of other soluble salts because the run-off carries them away in solution.

If rainfall and potential evapo-transpiration are not equal, but their difference is small enough to be stored in the ground when